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ABSTRACT

This report presents the procedures, results and conclusions of a study designed to compare the effectiveness of several feedback modes for correcting errors in computer-assisted instruction. Seventy-five university upperclassmen were taught 30 general science concepts by means of a computer-assisted adjunct auto-instruction program. Subjects were assigned to five strata on the basis of scholastic aptitude; in each stratum, subjects were randomly assigned to one of the five treatment groups which differed only with regard to feedback modes. A treatment X level analysis of variance was performed to determine whether differences existed between any of the treatment groups with respect to any of several variables tested. Group means were not significant with regard to SAT scores, pretest scores, or the time required for subjects to attain the criterion of 30 correct responses. Results indicated that the most significant factor in the rate of error correction by adjunct auto-instruction is guiding the subject to the correct response. The most significant factor in immediate retention is the amount of feedback information the subject receives. Analysis of variance tables are included. (LC)

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A COMPARISON OF THE EFFECTIVENESS OF SEVERAL FEEDBACK MODES FOR CORRECTING ERRORS IN COMPUTER-ASSISTED INSTRUCTION

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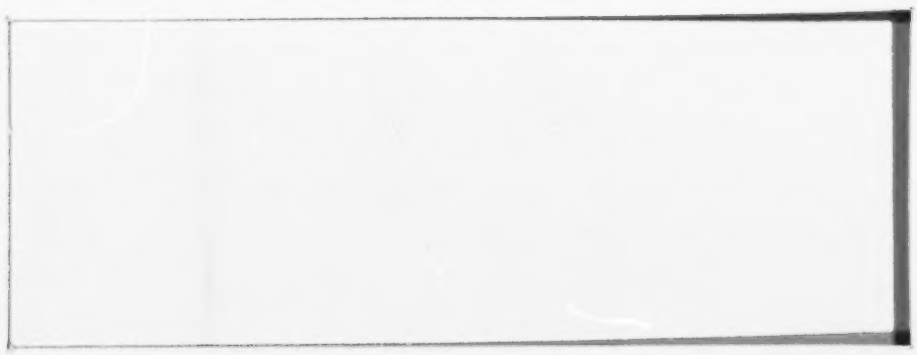

Foreword

The School of Education of Indiana State University is proud to present under this cover the scholarly work of its professors. The search for truth and educational wisdom is truly one that involves all of us, and efforts such as these are testimonials to the strength and vigor of this search.

One of the marks of a true professional is a willingness to share the results of his work with others who are involved in this quest. The distribution of papers such as this is a confirmation of this professional ideal.

It is most important that the men and women engaged in the task of expanding the boundaries of scholarship in education understand that their efforts are understood and appreciated. This statement is a way of telling them that all of us are honored by their accomplishments.

David Turney, Dean

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Portland, Oregon

April 28, 1969

Indiana State University
Terre Haute, Indiana

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A Comparison of the Effectiveness of Several Feedback Modes for Correcting Errors in Computer-Assisted Instruction

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ABSTRACT

Rationale

Feedback and knowledge of results are considered to be important factors in programmed learning and computer-assisted instruction. Prior studies in programmed learning have not been able to compare the effectiveness of the several modes of feedback in correcting student errors because these studies utilized low error rate linear type programs. Since few incorrect responses are made by a student learning by means of a linear type program, little is presently known concerning how feedback can be used to correct student errors.

The adjunct auto-instruction techniques developed by Sidney Pressey do not necessitate a low error rate program and thus provide a better means for investigating the use of feedback to correct learner errors.

Statement of the Problem

This study investigated four questions regarding feedback in a computer-assisted adjunct auto-instruction program:

1. Does feedback mode have an effect on original learning?
2. Does feedback mode have an effect on immediate retention?
3. Does feedback mode have an effect on the amount of time required for instruction?

Procedure Used

Seventy-five university upperclassmen were taught 30 general science concepts by means of a computer-assisted adjunct auto-instruction program. The frames of the program were multiple-choice items dealing with general science concepts. One response to each item was a correct response, one response to each item was a common misunderstanding of the concept, and the other two responses were reasonable and plausible distractors.

Equipment used was a Didactor, solid state computer, DTR 300, equipped with touch-tone terminals, 35mm film, timed interface and sequence presentation. The treatment groups differed only with regard to feedback modes. The five modes of feedback compared were (Group A) no feedback, (Group B), feedback of "correct" or "wrong," (Group C) feedback of the correct response choice, (Group D) feedback appropriate to the student's response, (Group E) a combination of the feedback modes of Groups B, C, and D.

Ss were assigned to five strata on the basis of scholastic aptitude. The twenty Ss in each strata were randomly assigned to one of the five treatment groups. A treatment x level analysis of variance was performed to determine whether differences existed between any of the treatment groups with respect to any of several variables tested. Tukey's W-Procedure was used to ascertain if differences existed between specific pairs of means.

Results

Tables summarizing the results are in the appendix.

The means of the five treatment groups were not significant ($p > .05$) with regard to SAT scores, pretest scores, or the time required for the Ss to attain the criterion of thirty correct responses.

The means of the knowledge of correct response group (Group C) and the combination of feedback modes group (Group E) were significantly better than the other groups with respect to the responses to attain criterion on Trial 1. Group B(the knowledge of results group) was significantly better than the no feedback group ($p > .05$) with respect to the number of responses required to attain criterion on Trial 1.

The means of groups C and E were also significantly better ($p < .01$) than the other groups in terms of the number of responses required to attain criterion on Trial 2, with the exception that there were no significant differences between Groups C and A.

Posttest results indicate better immediate retention ($p < .01$) in terms of number of correct responses on trial 2 for Group E over all other groups. Group C was also significantly better than Groups B and D on number of correct responses on the posttest.

Discussion

Apparently the most significant factor in the rate of error correction by adjunct auto-instruction is guiding the S to the correct response. The most significant factor in immediate retention is the amount of feedback information or the bits of information the student receives.

SCHOLASTIC APTITUDE
TEST SCORES

A. GROUP MEANS

A	B	C	D	E
413.4	420.6	425.5	409.4	417.8

B. ANALYSIS OF VARIANCE

SOURCE	df	F RATIO	SIGNIFICANCE
Treatment	4	0.583	n.s.
Levels	4	66.065	.01
Interaction	16	1.02	n.s.

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RESPONSES TO CRITERION
TRIAL I

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A. GROUP MEANS

A	B	C	D	E
67.4	63.9	53.5	62.9	53.1

B. ANALYSIS OF VARIANCE

SOURCE	df	F RATIO	SIGNIFICANCE
Treatment	4,	21.26	.01
Levels	4	.64	n. s.
Interaction	16	1.05	n. s.

C. DIFFERENCES BETWEEN PAIRS OF MEANS

GROUP	B	C	D	E	TURKEY'S W
A	3.5*	13.9**	4.5**	14.3**	$.05\,W_{5,50} = 3.2$
B		10.4**	1.0	10.8**	$.01\,W_{5,50} = 3.8$
C			10.4**	0.4	
D				9.8**	

CORRECT RESPONSES TRIAL 1
(PRETEST)

A. GROUP MEANS

A	B	C	D	E
8.9	10.1	8.9	8.8	9.7

B. ANALYSIS OF VARIANCE

SOURCE	df	F RATIO	SIGNIFICANCE
Treatment	4,	.89	n. s.
Levels	4	.51	n. s.
Interaction	16	1.55	n. s.

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TIME TO CRITERION TRIAL 1

A. GROUP MEANS (minutes)

A	B	C	D	E
24.9	25.1	22.4	30.7	27.6

B. ANALYSIS OF VARIANCE

SOURCE	df	F RATIO	SIGNIFICANCE
Treatment	4,	4.85	n. s.
Levels	4	1.27	n. s.
Interaction	16	.82	n.s.

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RESPONSES TO CRITERION
TRIAL 2

A. GROUP MEANS

5

A	B	C	D	E
36.9	39.4	34.3	35.6	30.9

B. ANALYSIS OF VARIANCE

SOURCE	df	F RATIO	SIGNIFICANCE
Treatment	4	7.30	.01
Levels	4	1.89	n.s.
Interaction	16	.99	n.s.

C. DIFFERENCES BETWEEN PAIRS OF MEANS

GROUP	B	C	D	E
A	2.5	2.5	1.3	6.0**
B		5.1**	3.8**	8.5**
C			1.3	3.5*
D				4.7**

TURKEY'S W

.05 W 5, 50 2.8

.01 W 5, 50 3.2

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CORRECT RESPONSES
TRIAL 2 (POSTTEST)

A. GROUP MEANS

A	B	C	D	E
24.9	24.1	26.3	26.3	29.4

B. ANALYSIS OF VARIANCE

SOURCE	df	F RATIO	SIGNIFICANCE
Treatment	4,	7.76	.01
Levels	4	2.00	n. s.
Interaction	16	1.05	n. s.

C. DIFFERENCES BETWEEN PAIRS OF MEANS

GROUP	B	C	D	E
A	0.8	1.5	1.5	4.5**
B		2.3*	2.3*	5.3**
C			0	3.1**
D				3.1**

TURKEY'S W

.05 $W_{5,50}$ 1.7

.01 $W_{5,50}$ 2.0

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Time to Criterion
Trial 2

A. GROUP MEANS

7

A	B	C	D	E
11.9	13.4	10.2	14.6	11.5

B. ANALYSIS OF VARIANCE

SOURCE	df	F RATIO	SIGNIFICANCE
Treatment	4_1	3.3	n. s.
Levels	4	1.47	n. s.
Interaction	16	1.3	n. s.

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